InteropEHRate

EHR in people's hands across Europe



MID-TERM PUBLIC WORKSHOP

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INTEROPEHRATE D2D PROTOCOL

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USERS' PROBLEM

- In the Healthcare sector terms such as "APIs", "Blockchain", and "Machine Learning", promise to solve the challenge of maintaining and facilitating the exchange, sharing and analysis of healthcare information
- Medical information is usually still stored on paper, and when it has to be shared between healthcare ecosystem entities, it happens by <u>mail</u>, <u>fax</u> or by the <u>patients</u> <u>themselves</u>, who often bring their files from appointment to appointment
- When exchanging healthcare information that is inaccurate, this leads to:
 - Inefficiency
 - Costs

Low value care



"...the right data is not at the right time so providers cannot make the right decisions"



Citizens cannot participate and contribute actively in their care



SCENARIO: MEDICAL VISIT



D2D PROTOCOL PROPOSITION

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Novelties

- Based on a globally used short-range distance (up to 100 m) data exchange protocol (Bluetooth v4.0)
- D2D protocol compatible by the main market Operating Systems (specific Bluetooth Profiles used)
- Secure and easy-to-use data exchange process with minimum user interactions and fast response times

D2D PROTOCOL SPECIFICATION



D2D PROTOCOL: CONNECTION

| InteropEHRate | | Home Current Patient Administration | InteropEHRate | Home Current Patient Administration | InteropEHRate | Home Current Patient Administration |
|---------------|--|-------------------------------------|---|-------------------------------------|--|--|
| Press the b | utton to put the application in conne Open connection | ection mode. | Scan the QR code with your S-EHR to establish the | e bluetooth connection | General First Nar Mario Family N Rossi ID Patiet Patient/30 | Connected Close connector Info about patient ne ame It 1870ce-3ffa-4d3c-bf2c-d19d69441fd0 |
| | LC M700 Image: Section 3 Mario Rossi Mario Rossi Mario Rossi Image: Section 3 Image: Section 3 | | Image: Statute Image: Stat | C Dlue app | C M700 C M700 Sharing Sharing Suc Your are n application C C C C | Control Contro |

D2D PROTOCOL SPECIFICATION D2D Protocol Steps Step 1: HCP app gets the advertised connection request **Step 2:** S-EHR app gets the Healthcare Organization identity Demographic Step 3-4: HCP app gets the decision from the side of the S-EHR app (possibly with Personal Identity) Data Exchange Step 5: S-EHR app gets the decision from the side of the HCP app (possibly with Temporary Consent Request) 2: healthOrganizationIdentity = getHealthOrganizationIdentity(sessionConnectionID): object HealthOrganizationIdentity 3: connectionClosureMessage = getHealthOrganizationDecision(sessionConnectionID) : String alt

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D2D PROTOCOL: DEMOGRAPHIC DATA EXCHANGE



| eropEHRate | | Home Current Patient | Administration |
|------------|--|----------------------|----------------|
| | | | |
| | Connected | | |
| | Close connection | | |
| | General info about patient | | |
| | First Name | | |
| | Mario | | |
| | Family Name | | |
| | Rossi | | |
| | ID Patient | | |
| | Patient/303870ce-3ffa-4d3c-bf2c-d19d69441fd0 | | |
| | | | |
| | | | |
| | | | |

D2D PROTOCOL SPECIFICATION D2D Protocol Steps Step 1: HCP app gets the advertised connection request **Step 2:** S-EHR app gets the Healthcare Organization identity Step 3-4: HCP app gets the decision from the side of the S-EHR app (possibly with Personal Identity) Step 5: S-EHR app gets the decision from the side of the HCP app (possibly with Temporary Consent Request) Consent Exchange **Step 6-7-8: HCP app gets the consent decision from the side of the S-EHR app (possibly Patient Summary)**



D2D PROTOCOL: CONSENT EXCHANGE

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| Sharing : | |
| | Commented |
| | Connected |
| | Close connection |
| Librua read and understood | General info about patient |
| InteropEHRate's <u>Privacy Policy</u> . | |
| I hereby give permission to the recipient | First Name |
| store, edit etc.) the personal data | Mario |
| on this application for the purpose of medical diagnosis and/or treatment | |
| I understand that my consent will remain valid for these purposes unless I | Family Name |
| affirmatively withdraw it. I have the right to withdraw this consent at any time. | Rossi |
| | |
| Cancel | ID Patient |
| | Patient/303870ce-3ffa-4d3c-bf2c-d19d69441fd0 |
| | |
| (+) | Consent |
| | I have read and understood InteropEHRate's Privacy Policy. I hereby give permission to the recipient health care provider to process (view, store, edit |
| | that my consent will remain valid for these purposes unless I affirmatively withdraw it. I have the right to withdraw this consent at any time. |
| | |
| | |

| D | 2D PROTOCOL SPECIFICATION | | | | | |
|------------------|---|--|--|--|--|--|
| | D2D Protocol Steps | | | | | |
| | Step 1: HCP app gets the advertised connection request | | | | | |
| | Step 2: S-EHR app gets the Healthcare Organization identity Step 3-4: HCP app gets the decision from the side of the S-EHR app (possibly with Personal Identity) | | | | | |
| | | | | | | |
| | Step 5: S-EHR app gets the decision from the side of the HCP app (possibly with Temporary Consent Request) | | | | | |
| Health | Step 6-7-8: HCP app gets the consent decision from the side of the S-EHR app (possibly Patient Summary) | | | | | |
| Data Exchange | Step 9: S-EHR app gets consultation results | | | | | |
| | [Consent approved] 8: healthcareData = getConsentDecision(sessionConnectionID) : object | | | | | |
| 13 | 9: evaluationData = getEvaluationData(sessionConnectionID): object | | | | | |

D2D PROTOCOL: HEALTH DATA EXCHANGE

| LG M700 | G 0 0 | K 🖸 🔸 🚸 C O | | |
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| Sharing | | : | | |
| Mario Rossi | | | | |
| IVIC | 110 110331 | | | |
| Sections Overvie | w Timeline | Sharing | | |
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| Sharing status the patient data has been sent | | | | |
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|---|------------|-------------------------------------|-----------------|---------|----------------|-------------|
| Allergies and Intolerances | | | | | | |
| Problems | Identifier | Name | Clinical Status | Туре | Category | Crtitically |
| History of Procedure Immunizations | | Penicillina -classe di antibiotico- | | Allergy | Medication | High Risk |
| Medical Devices | | | Language | Section | Original Trans | slated Add |
| Diagnostic Results | | | Language | Jeedon | onginar nan | |
| | | | | | | |
| History of Past Illness | | | | | | |
| History of Past Illness Functional Status | | | | | | |
| History of Past Illness Functional Status Plan of Care | | | | | | |
| History of Past Illness Functional Status Plan of Care Social History | | | | | | |
| History of Past Illness Functional Status Plan of Care Social History History Pregnancy | | | | | | |

D2D PROTOCOL SPECIFICATION

D2D Protocol Steps

Step 1: HCP app gets the advertised connection request

Step 2: S-EHR app gets the Healthcare Organization identity

Step 3-4: HCP app gets the decision from the side of the S-EHR app (possibly with Personal Identity)

Step 5: S-EHR app gets the decision from the side of the HCP app (possibly with Temporary Consent Request)

Step 6-7-8: HCP app gets the consent decision from the side of the S-EHR app (possibly Patient Summary)

Step 9: S-EHR app gets consultation results

Connection Closure

Step 10: HCP app gets the connection closure message

10: connectionClosureMessage = getConnectionClosureMessage(sessionConnectionID): String

ConnectionClosureMessage

D2D PROTOCOL: CONNECTION CLOSURE



| teropEHRate | Home Current Patient Administratic |
|---|---|
| a americana a Colombia | |
| | Connected |
| | Close connection |
| General info about patient | |
| First Name | |
| Mario | |
| Family Name | |
| Rossi | |
| ID Patient | |
| Patient/303870ce-3ffa-4d3c-bf2c-d19d69441fd0 | |
| Consent | |
| I have read and understood InteropEHRate's Privacy Poli etc.) the personal data stored in my Personal Health Rec | icy. I hereby give permission to the recipient health care provider to process (view, store, edit |

that my consent will remain valid for these purposes unless I affirmatively withdraw it. I have the right to withdraw this consent at any time.

D2D PROTOCOL IMPLEMENTATION: S-EHR-side (1/2)





D2D PROTOCOL IMPLEMENTATION: HCP-side (2/2)





NEXT STEPS

- Add option for citizen to send partial information (upon request) of a HL7 FHIR resource
- Add operations for transmitting other kind of health data (Medical Images)
- Specify D2D protocol in a more independent way avoiding mandatory oneto-one interactions
- Testing with different short-range distance communication technologies (e.g. Wi-Fi Direct)



THANK YOU

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D4.1 D2D & R2D protocol specification

D4.2 Specification of remote and D2D protocol and APIs for HR exchange - V1

D4.4 D2D & R2D protocol libraries implementation

D4.12 D2D & R2D protocol libraries demonstration

